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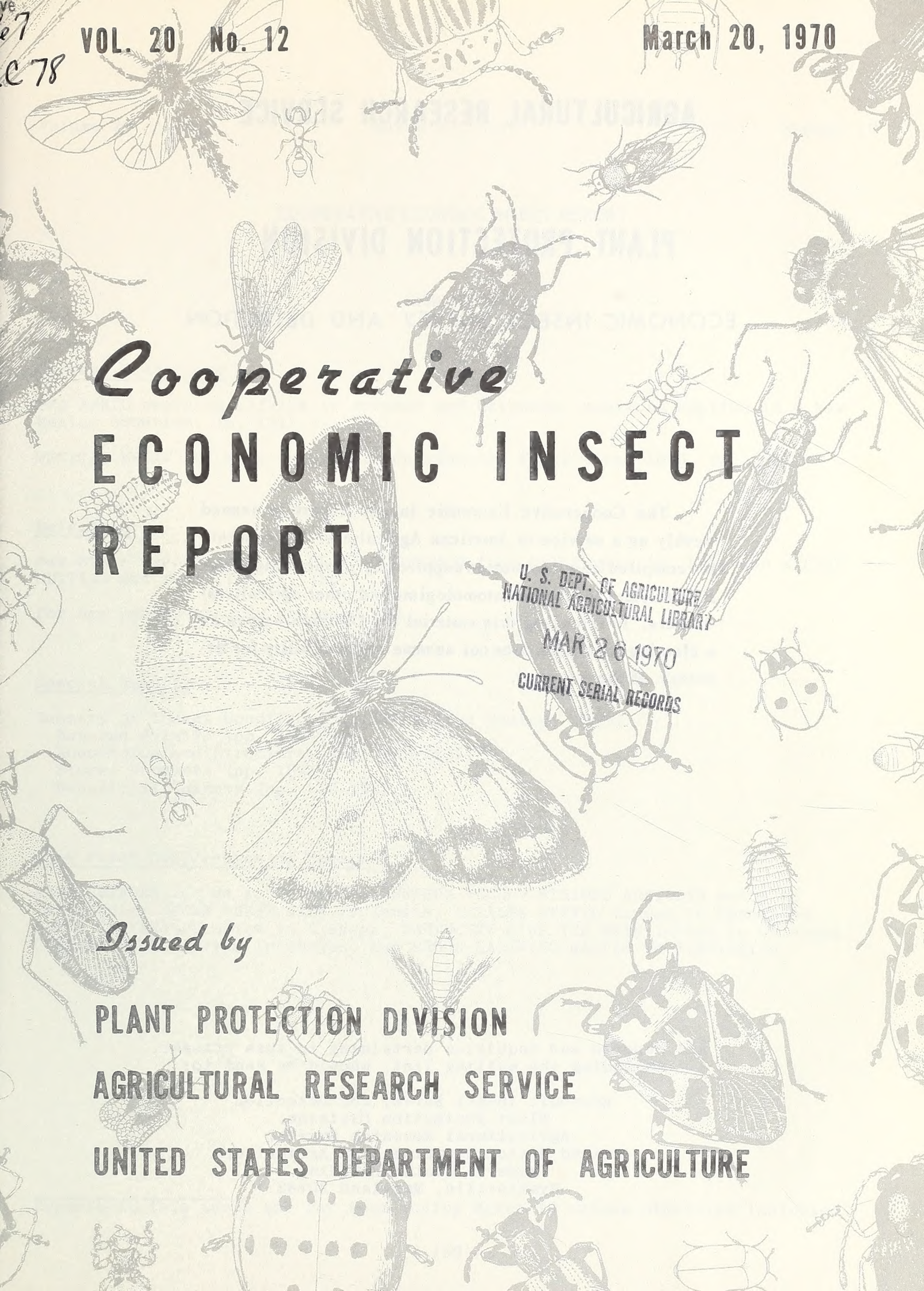

Cooperative ECONOMIC INSECT REPORT

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PLANT PROTECTION DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

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PLANT PROTECTION DIVISION

ECONOMIC INSECT SURVEY AND DETECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Plant Protection Division
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Volume 20 March 20, 1970 Number 12

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

PEA APHID heavy on alfalfa in Arizona and Oklahoma; controls applied in 3 New Mexico counties. (p. 171).

MEXICAN FRUIT FLY male trapped in California, first since 1965. (p. 174).

Detection

New State records include BROWN COCKROACH from California (p. 174) and a LEAF-CUTTING BEE from UTAH (p. 186).

For new county records see page 174.

Special Reports

Summary of Insect Conditions in the United States - 1969
- Man and Animals (pp. 176-182).
- Households and Structures (pp. 182-183).
- Stored Products (pp. 184).
- Beneficial Insects (pp. 185-188).

Some First Occurrences of Season

ARMY CUTWORM larvae in Colorado; WESTERN YELLOW-STRIPED ARMYWORM moths in California; BROWN WHEAT MITE in Kansas; ALFALFA WEEVIL larvae in Tennessee; GREEN CLOVERWORM moths in Alabama; NANTUCKET PINE TIP MOTH larvae in Oklahoma; CURRANT BORER larvae in Oregon; and BROWN LACEWING adults in Washington.

Reports in this issue are for week ending March 13 unless otherwise indicated.

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WEATHER BUREAU'S 30-DAY OUTLOOK

MID-MARCH TO MID-APRIL 1970

The Weather Bureau's 30-day outlook for mid-March to mid-April is for temperatures to average below seasonal normals over central and southern portions of the Plateau region and the Great Plains. Above normal temperatures are indicated for the California coast as well as the Great Lakes region and the Southeast. Elsewhere near normal temperatures are in prospect. Precipitation is expected to exceed normal along the north Pacific coast, the central Plateau and eastern half of the Nation except for near to below normal totals in Florida. Subnormal amounts are in prospect in the Rio Grande Valley as well as the southern half of California. In unspecified areas near normal precipitation is indicated.

Weather forecast given here is based on the official 30-day "Resume and Outlook" published twice a month by the Weather Bureau. You can subscribe through the Superintendent of Documents, Washington, D.C. 20250. Price $5.00 a year.

WEATHER OF THE WEEK ENDING MARCH 16

HIGHLIGHTS: The Far West continued mild. Cold weather predominated over the Central and East. Heavy snow fell in parts of the central Great Plains.

PRECIPITATION: Late winter storms dumped heavy snow to several parts of the Nation last week. Parts of the northern and central Rocky Mountains and the nearby Great Plains received heavy snow early in the week. By noon Monday, 18 inches of new snow had fallen at Hill City in the Black Hills of South Dakota. West Yellowstone, Montana, received 15 inches of new snow bringing the total depth to 48 inches. A foot of new snow fell at Ord, Nebraska, and Norfolk, Nebraska, received 9 inches Monday afternoon. This storm dumped 6 to 10 inches in southern South Dakota, northern Nebraska, and northwestern Iowa before spreading eastward to the Great Lakes. Freezing rain, freezing drizzle, and sleet along the southern edge of the snow belt slicked the highways in spots and made travel hazardous. A midweek storm produced snow in Arizona, New Mexico, Colorado, Oklahoma, and Kansas. Six to 10 inches fell in eastern New Mexico and Colorado. By noon, Thursday, 8 inches had fallen in the Missouri Ozarks and 5 inches in the

Weather of the week continued on page 175.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

ARMY CUTWORM (*Chorizagrotis auxiliaris*) - COLORADO - Second and third instars feeding on alfalfa in Larimer County. (Cross). KANSAS - Survey negative on wheat and alfalfa in Comanche County. (Brooks).

GREENBUG (*Schizaphis graminum*) - KANSAS - Surveys negative in Reno and Kingman Counties. Mostly light in Comanche County; increasing in some fields, ranged 25-50 per linear foot of wheat. No damage. (Brooks). Surveys negative in 1 southwest, 2 central, 3 north-central, and 4 south-central, counties. Ranged 1-3 per linear foot in Saline and Ottawa Counties. (Redding, Martinez). OKLAHOMA - Heavy in scattered wheatfields in Woods County; ranged 50-500 per linear foot in Ellis County. Ranged 2-40 per linear foot in few fields in Blaine, Woodward, Texas, and Beaver Counties. Ranged up to 400 per linear foot in Noble County; 50-75 per linear foot common in Garfield County. Moderate to heavy in Kingfisher County and moderate in Canadian County. Ranged 0-5 per linear foot in Le Flore, McCurtain, and Bryan Counties. (Okla. Coop. Sur.). ARIZONA - Highest count 25 per row foot on 10-inch barley on Salt River Indian Reservation, Maricopa County. Very light on barley in Yuma Valley, Yuma County. (Ariz. Coop. Sur.). COLORADO - Surveys negative on wheat in Larimer, Boulder, and Weld Counties. (Johnson).

SPOTTED ALFALFA APHID (*Therioaphis maculata*) - FLORIDA - Nymphs and adults totaled 40 in 100 sweeps of alfalfa at Gainesville, Alachua County. (Mead). ARIZONA - Ranged 800-1,200 per 100 sweeps of alfalfa in Gila Valley, Yuma County. (Ariz. Coop. Sur.).

SMALL GRAINS

WESTERN YELLOW-STRIPED ARMYWORM (*Prodenia praefica*) - CALIFORNIA - Adults collected in light traps in Yolo County. Some females gravid. (Cal. Coop. Rpt.).

WINTER GRAIN MITE (*Penthaleus major*) - OKLAHOMA - Averaged 8 per linear foot in wheat in Blaine County. Common in Noble County, moderate to heavy in Kingfisher County, and light in Canadian County. (Okla. Coop. Sur.).

BROWN WHEAT MITE (*Petrobia latens*) - KANSAS - Light on wheat in McPherson, Saline, Ottawa, Cloud, Republic, Washington, and Clay Counties. (Redding).

AN APHID (*Rhopalosiphum padi*) - OKLAHOMA - Ranged 10-100 per linear foot on small grain in McCurtain, Le Flore, and Bryan Counties. (Okla. Coop. Sur.).

A THRIPS (*Rhipidothrips brunneus*) - CALIFORNIA - Adults medium on barley at Zamora, Yolo County. (Cal. Coop. Rpt.).

TURF, PASTURES, RANGELAND

CHINCH BUG (*Blissus leucopterus*) - KANSAS - Bunch grass samples for spring survey collected late February from a total of 51 counties in central and eastern districts. Total of 145 samples collected. Average number per square foot by district as follows: North-central 63, central 158, south-central 212, northeast 3, east-central 10, and southeast 155. (Martinez, Redding, Guldner).

FORAGE LEGUMES

PEA APHID (*Acyrthosiphon pisum*) - ARIZONA - Counts per 100 sweeps of alfalfa ranged 2,500-3,000 in Gila and Yuma Valleys and 200-500 on Yuma Mesa, Yuma County. (Ariz. Coop. Sur.). NEW MEXICO - About 5,000 acres of alfalfa treated in De Baca, Eddy, and Chaves Counties. (Peabody et al.). OKLAHOMA - Heavy to very heavy in alfalfa in Kay and Alfalfa Counties. Some fields sprayed. Ranged up to 100 per square foot of crown in Payne County and light in Garvin County. (Okla. Coop. Sur.). KANSAS - Light on new alfalfa growth in Comanche County. (Brooks). FLORIDA - Nymphs and adults 175 in 100 sweeps of alfalfa at Gainesville, Alachua County. Increase over previous samples. (Mead).

NOCTUID MOTHS - ARIZONA - Colias eurytheme (alfalfa caterpillar) larvae ranged 0-5 and Trichoplusia ni (cabbage looper) larvae ranged 500-800 per 100 sweeps of alfalfa at Yuma Valley, Yuma County. (Ariz. Coop. Sur.). FLORIDA - Plathypena scabra (green cloverworm) larvae 21 in 100 sweeps of alfalfa at Gainesville, Alachua County. (Mead). ALABAMA - P. scabra moth flights occurred throughout south and central areas. Numbers normal. (McQueen).

ALFALFA WEEVIL (Hypera postica) - VIRGINIA - Overwintering adults less abundant than 1969 throughout State. Anticipated spring populations will be less damaging. (W.A. Allen et al.). TENNESSEE - First and second instars present in most alfalfa fields; eggs hatching. No damage reported in Giles and Hardeman Counties. (Edwards et al.).

WEEVILS (Hypera spp.) - ARIZONA - H. brunneipennis (Egyptian alfalfa weevil) counts per 100 sweeps of alfalfa in Yuma County as follows: Larvae and adults 80-100 in Yuma Valley; larvae 6-8 and adults 3-5 on Yuma Mesa. (Ariz. Coop. Sur.). OKLAHOMA - H. punctata (clover leaf weevil) larvae causing some damage to alfalfa in scattered areas of Pontotoc County. (Okla. Coop. Sur.).

LYGUS BUGS (Lygus spp.) - ARIZONA - Heavy, ranged 300-400 per 100 sweeps of alfalfa at Yuma Valley; 20-30 on Yuma Mesa, 5-10 in Gila Valley, Yuma County. (Ariz. Coop. Sur.). FLORIDA - L. lineolaris (tarnished plant bug) adults 15 in 100 sweeps of alfalfa at Gainesville, Alachua County. (Mead).

DECIDUOUS FRUITS AND NUTS

A LYGUS BUG (Lygus hesperus) - WASHINGTON - Heavy in untreated pear orchards at Wapato, Yakima County, March 8. (Gregorich).

CITRUS

Citrus Insect Situation in Florida - End of February - CITRUS RUST MITE (Phyllocoptruta oleivora) infested 70 (norm 62) percent of groves; economic in 43 (norm 41) percent. Population dropped out of high range in 3 districts, but expected to increase. Will continue above normal for this time of year. Highest districts west and east. CITRUS RED MITE (Panonychus citri) in 48 (norm 37) percent of groves; economic in 16 (norm 14) percent. Population increased and is slightly above normal. Increase to moderate level expected. A few groves in all districts may develop heavy infestations. Highest district west. TEXAS CITRUS MITE (Eutetranychus banksi) in 22 (norm 31) percent of groves; economic in 4 (norm 11) percent. Decreased to very low level and is much below normal. Little change expected. Highest district west. SIX-SPOTTED MITE (Eotetranychus sexmaculatus) infested 2 percent of groves; none economic. Gradual increase expected. GLOVER SCALE (Lepidosaphes gloverii) in 78 (norm 78) percent of groves; economic in 9 (norm 17) percent. Population below normal and in moderate range; increase expected. Highest district east. PURPLE SCALE (L. beckii) in 69 (norm 77) percent of groves; economic in 5 (norm 9) percent. Below normal; at low level. Little change expected. Highest district north. CHAFF SCALE (Parlatoria pergandii) in 46 (norm 61) percent of groves; economic in 1 (norm 9) percent. Population much below normal and in low range. Slight increase expected. Highest district north. BLACK SCALE (Saissetia oleae) in 14 (norm 33) percent of groves; economic in 3 (norm 14) percent. Population at lowest February level since 1963 due to subfreezing temperatures in early January. Little change expected. YELLOW SCALE (Aonidiella citrina) in 58 (norm 63) percent of groves; economic in 9 (norm 13) percent. Population expected to remain near normal moderate level for March. Scattered groves will harbor important infestations. Highest district north. An ARMORED SCALE (Unaspis citri) in 25 percent of groves; moderate in 8 percent. Population low statewide. This species heavier than in previous years in February. Increase expected. APHIDS scarce, will increase in March and early April. WHITEFLIES in 59 (norm 55) percent of groves; economic in 32 (norm 22) percent. Population much above normal and in moderate range. Little change expected. (W.A. Simanton (Citrus Expt. Sta., Lake Alfred)).

CITRUS RED MITE (Panonychus citri) - ARIZONA - Few groves treated at Yuma, previously infested groves watched in Yuma County. (Ariz. Coop. Sur.).

AN ARMORED SCALE (Unaspis citri) - FLORIDA - All stages moderate on 90 percent of 1,600 citrus plants at Plymouth, Orange County. (Speaker).

OMNIVOROUS LOOPER (Sabulodes caberata) - CALIFORNIA - Larvae heavy on tangelo trees at Camarillo, Ventura County. (Cal. Coop. Rpt.).

SMALL FRUITS

CURRANT BORER (Ramosia tipuliformis) - OREGON - Larvae light in 3-year-old currant field near Oregon City, Clackamas County. (Rosenstiel).

ORNAMENTALS

WEEVILS (Brachyrhinus spp.) - OREGON - Late instars of B. ovatus (strawberry root weevil) ranged up to 15 per plant on roots of arborvitae in field nursery at Gresham. B. rugosostriatus larvae ranged up to 10 per plant on yew in several Multnomah County field nurseries. (Larson, Rosenstiel).

FLORIDA WAX SCALE (Ceroplastes floridensis) - ALABAMA - Overwintered scales light on many magnolia trees in Lee County. Some on camellia shrubs and old dahlia stalks. Importance minor in central and northern areas; importance economic in southern areas. (McQueen).

AN ARMORED SCALE (Abgrallaspis cyanophylli) - CALIFORNIA - Heavy on euphorbia nursery stock at Lompoc, Santa Barbara County. (Cal. Coop. Rpt.).

FOREST AND SHADE TREES

NANTUCKET PINE TIP MOTH (Rhyacionia frustrana) - OKLAHOMA - Small larvae present in about 10 percent of terminals of young pine trees in McCurtain, Le Flore, and Bryan Counties. (Okla. Coop. Sur.).

MAN AND ANIMALS

SCREW-WORM (Cochliomyia hominivorax) - No cases reported in U.S. March 8-14. Total of 56 laboratory-confirmed cases reported in portion of Barrier Zone in Republic of Mexico March 1-7 as follows: Sonora 39, Chihuahua 8, Tamaulipas 9. Total of 2 cases reported in Mexico south of Barrier Zone. Barrier Zone is area where eradication operation underway to prevent establishment of self-sustaining population in U.S. Sterile screw-worm flies released: Texas 4,128,000; Mexico 130,620,000. (Anim. Health Div.).

SHORT-NOSED CATTLE LOUSE (Haematopinus eurysternus) - OKLAHOMA - Cattle lice, mostly this species, heavy in several northwest, north-central, and northeast counties. Scattered and moderate to heavy in Garvin and Bryan Counties. (Okla. Coop. Sur.).

SOUTHERN HOUSE MOSQUITO (Culex pipiens quinquefasciatus) - ALABAMA - First larvae of season in Lee County. Few adults observed. (McQueen).

COMMON CATTLE GRUB (Hypoderma lineatum) - OKLAHOMA - Light in backs of cattle in Payne County; ranged 1-4 per head in 3 of 18 animals. Light to moderate in Garvin County. (Okla. Coop. Sur.). TENNESSEE - Averaged 4.7 per animal in 41 of 125 head of cattle in Giles County. (Edwards et al.).

HOG LOUSE (Haematopinus suis) - MISSISSIPPI - Averaged 1.5 behind ears on 30 head of hogs at State College, Oktibbeha County. (Sartor).

LONE STAR TICK (Amblyomma americanum) - OKLAHOMA - Adults and few nymphs in forest floor duff in eastern areas during warm days. (Okla. Coop. Sur.).

NORTHERN FOWL MITE (Ornithonyssus sylviarum) - MISSISSIPPI - Light on caged hens at State College, Oktibbeha County. (Sartor).

BROWN RECLUSE SPIDER (Loxosceles reclusa) - ARKANSAS - Specimen collected from Arkansas County. (Lincoln, Rouse). This is a new county record. (Boyer).

HOUSEHOLDS AND STRUCTURES

BROWN COCKROACH (Periplaneta brunnea) - CALIFORNIA - Infestation detected in apartment at Inglewood, Los Angeles County, October 1968 by D. Reierson. Determined by G. Buxton, confirmed by A.B. Gurney. This is a new State record. Tenants moving from out of State may have introduced this pest. (Cal. Coop. Rpt.).

A CARPENTER ANT (Camponotus caryae) - OKLAHOMA - Swarming and entering home at Stillwater, Payne County. (Okla. Coop. Sur.).

OLD-HOUSE BORER (Hylotrupes bajulus) - TENNESSEE - Reported for the first time in Johnson County. This is a new county record. (Walker).

BENEFICIAL INSECTS

A BRACONID (Lysiphlebus testaceipes) - OKLAHOMA - Parasitized greenbugs in Woodward, Blaine, and Noble Counties. (Okla. Coop. Sur.).

BROWN LACEWINGS - WASHINGTON - Adults found March 5 on apples at Cowiche, Yakima County. (Gregorich).

FEDERAL AND STATE PLANT PROTECTION PROGRAMS

IMPORTED FIRE ANT (Solenopsis saevissima richteri) - ALABAMA - Infestations in east-central area remain about same as 1969. Spring mound building occurring. Estimated winter mortality of total average colony 4 percent. Expect little effect on population and new colony development in 1970. (Barwood).

MEXICAN FRUIT FLY (Anastrepha ludens) - CALIFORNIA - One wild male fly trapped March 3 at San Diego, San Diego County; last wild fly trapped October 7, 1965, one mile west and a little north of main gate at Tijuana. (PPD).

DETECTION

New State Records - BROWN COCKROACH (Periplaneta brunnea) CALIFORNIA - Los Angeles County (p. 174). A LEAFCUTTING BEE (Megachile concinna) UTAH - Salt Lake County (p. 186).

New County Records - BROWN RECLUSE SPIDER (Loxosceles reclusa) ARKANSAS - Arkansas (p. 174); NEBRASKA - Gage (p. 182); OLD-HOUSE BORER (Hylotrupes bajulus) TENNESSEE - Johnson (p. 174).

LIGHT TRAP COLLECTIONS

FLORIDA - Gainesville, 3/6-12, BL - Black cutworm (Agrotis ipsilon) 1, granulate cutworm (Feltia subterranea) 28, salt-marsh caterpillar (Estigmene acrea) 7. TEXAS - Waco, 3/5-12, BL - Armyworm (Pseudaletia unipuncta) 23, granulate cutworm 3, variegated cutworm (Peridroma saucia) 36, yellow-striped armyworm (Prodenia ornithogalli) 19.

CORRECTIONS

CEIR 20(10):147 - A LARGID BUG (Largus succinotus) should read A LARGID BUG (Largus succinctus).

HAWAII INSECT REPORT

Pasture - ARMYWORM (Pseudaletia unipuncta) larvae light, average 2 per square foot, in Kikuyu grass pastures, no damage, at Waihee and Haiku, Maui. (Ah Sam, Miyahira).

General Vegetables - All stages of GREENHOUSE WHITEFLY (Trialeurodes vaporariorum) trace to light in snap beans at Pupukea and Waimea, Oahu. Trace in 0.25 acre of cucumber seedlings at Pupukea. Adults of LEAF MINER FLIES (Liriomyza spp.) moderate in 0.30 acre of zucchini at Waimea, mines light. All stages heavy in 1.5 acres of tomato at Hauula, Oahu. Adults up to 8 per leaf on 3-inch high seedlings. WATERLILY APHID (Rhopalosiphum nymphaeae) moderate (heavy in spots, up to 100-150 per leaf) in 2 acres of taro at Waihee; Maui. TARO LEAFHOPPER (Tarophagus proserpina) trace at same location and in 2 acres of taro at Wailua, Maui. (Miyahira).

Fruits - MANGO FLOWER BEETLE (Protaetia fusca) adults heavy, up to 29 per fruit, on backyard peach tree at Waimanalo, Oahu. (Suzukawa).

Ornamentals - A SPIDER MITE (Eotetranychus lewisi) light to heavy on poinsettia, caused discoloration of leaves throughout Kona, Hawaii. (Funasaki). All stages of CRESCENT-MARKED LILY APHID (Neomyzus circumflexus) moderate in 0.25 acre of easter lily at Kilauea, Kauai. (Sugawa).

Beneficial Insects - SOUTH AFRICAN EMEX WEEVIL (Apion antiquum) larvae heavy on emex stems and adult damage moderate to leaves in pasture at Pukalani, Maui. (Miyahira).

Miscellaneous Insects - Male VAGRANT GRASSHOPPER (Schistocerca vaga) noted in wild vegetation at Keawakapu, Maui, is third specimen to date. (Ah Sam).

Weather continued from page 170.

Boston Mountains in northwestern Arkansas. By Friday the snow area had spread northeastward to southwestern New York and to the middle Atlantic coast. Thundershowers some accompanied by hail fell from the lower Mississippi River Valley. A weekend storm dumped more snow in Kansas, Oklahoma, Missouri, and Arkansas.

TEMPERATURE: Arctic air plunged southward across mid-America early Monday morning, March 9, bringing sharply colder temperatures. Concordia, Kansas, registered 32° Monday afternoon in contrast to the balmy 74° recorded the previous day. Maximums in the 70's were common from Oklahoma to the Gulf of Mexico on Monday but, on Thursday, after the cold air reached the gulf temperature at Houston, Texas, climbed only to 45°. Minimums in the northern Great Plains dropped to below zero on Tuesday and Wednesday. Chadron, Nebraska, registered 20° below zero on Wednesday morning. The weekend brought continued cold weather over the eastern half of the Nation. Subzero temperatures occurred in the Red River of the North Valley on Sunday and Monday mornings and in northern Maine, Monday morning. Weekly temperatures averaged slightly above normal in the Far West and the Great Basin and below normal from the Rocky Mountains to the Atlantic Ocean. Most of the Missouri, Mississippi, and Ohio River Valleys averaged 6° to 12° below normal. Parts of the Dakotas and Nebraska averaged more than 12° below normal. (Summary supplied by Environmental Data Service, ESSA.)

(Continued from page 168)

MAN AND ANIMALS

Highlights:

SCREW-WORM cases in 1969 were the lowest since the beginning of the eradication program in the Southwest. HORN FLY was heavy in Texas, caused weight loss in beef cattle in Mississippi, and was the most important fly pest of cattle in Florida. FACE FLY was found for the first time in Arkansas and Oklahoma, and continued to spread in California. This fly annoyed livestock in many areas. HOUSE FLY was a problem around livestock and poultry operations in several areas. MOSQUITOES were annoying in many sections of the Nation. TICKS were of some concern to man and livestock.

The lowest number of SCREW-WORM (Cochliomyia hominivorax) cases in history was reported in 1969. This was a new record for the Southwest Screw-worm Eradication Program, but officials fear relaxed vigilance could weaken the program.

Veterinarians of the Agricultural Research Service, U.S. Department of Agriculture, reported only 219 confirmed cases of screw-worm in the United States in 1969, the best record ever achieved. TEXAS had 161 cases, ARIZONA 32, NEW MEXICO 18, and CALIFORNIA 8. The best previous year was 1964 with 403 cases. The worst year since 1962, when the program began, was the 1968 outbreak with 9,878 cases. Efforts to reduce the screw-worm threat in northern Mexico also showed outstanding progress. Only 7,453 cases had been reported in neighboring Mexican States by December 27, compared with 19,452 for the same period in 1968. Program officials tempered their optimism with concern that ranchers were not inspecting livestock regularly for screw-worms which may permit some cases to go unreported. As an indication they cited a sharp decline in the collection of nonscrew-worm larval samples. Even when there are few screw-worms, if there is a high level of inspection, ranchers will find numerous blow fly larvae and send them in for identification. In 1969, nonscrew-worm cases totaled 3,101, compared with an average of 4,700 annually for the preceding 5 years. The decline was most noticeable in the last 6 months when only 944 nonscrew-worm samples were received, compared with 2,157 for the first half of the year. Eradication officials have been especially concerned since screw-worm was reported in Comal County, Texas, on December 15. Before then no other cases had been found east of the Pecos River since another case in Comal County on July 14. The nearest recent outbreak in Mexico was in mid-November near Piedras Negras, more than 160 miles away.

Screw-worm flies can travel more than 180 miles to lay eggs. Veterinarians say, however, that the pest usually does not spread that far without other cases appearing, spaced at shorter distances. During the year, the eradication program produced and distributed some 6.71 billion sexually sterile screw-worm flies over the Southwestern States and northern Mexico. A new "thin film" distribution pattern enabled officials to drop sterile flies in advance of known outbreaks, as well as over infested areas. The planning of sterile fly drops was improved by more comprehensive analysis of screw-worm spread. In northern Mexico, program workers were trained to identify larvae in the field, permitting quicker reporting and treatment of all outbreaks.

Current screw-worm infestations in the United States arise from fertile flies moving northward to the Mexican border and into the United States. Self-perpetuating populations of the pest were eradicated in the Southeast by a 1958-1959 program and in the Southwest by the present program from 1962-1966. Efforts are now directed toward maintaining a barrier zone along the border, in which billions of sterile flies are released, to prevent reestablishment of screw-worm in the United States. Screw-worm continues to be found in Puerto Rico, and was reported for the first time last summer in the U.S. Virgin Islands.

HORN FLY (Haematobia irritans) generally ranged 5-75 (averaged less than 50) per side of pastured cattle in Latah and Benewah Counties, IDAHO, during summer. Annoyance was minor. Horn fly was an important cattle pest in UTAH. It annoyed untreated cattle in WYOMING. Counts averaged up to 250 per head in August.

Horn fly populations of 50 or more per head infested cattle in NORTH DAKOTA by June 1. Counts on untreated animals increased to over 600 flies per head. An organic phosphate was aerially applied to 10,000 range cattle in Richland and Ransom Counties. In SOUTH DAKOTA counts of 200+ per side on untreated cows were common from July through August. Mid-July counts ranged 200-500 per side on Hereford and Angus cows and calves in southern Brule and northern Tripp Counties. Early July counts were lighter than usual, averaging 35 per side on untreated cows at Highmore, Hyde County. Aerial spraying of beef cattle is increasing in South Dakota. Counts in NEBRASKA increased from 10 per animal in mid-May to 500-600 per side in July in Saunders and Lancaster Counties. Populations peaked in August and were active into October. Horn fly was active on cattle in OKLAHOMA from late March to mid-November. Counts were heaviest in late May to early June, in early July, and in September. This pest was heavy on cattle in TEXAS. The heaviest infestations still occur in the Trans-Pecos area.

Horn fly in ARKANSAS was lighter than normal due probably to dry weather. Adults in MISSISSIPPI emerged early in April. Infestations increased to 100-300 flies per head of cattle in May and June, dropped to 25 per head in July, and reached 2,000 per head in August and September. As many as 25 flies per head were still present on treated cattle in Clay County in late November. Weight loss of beef cattle was estimated at $12,474,000. Horn fly was annoying throughout the season beginning in late March in south ALABAMA. Infestations were limited mainly to beef herds where proper control was not applied. In Alachua County, FLORIDA, it was the most important fly on livestock. Economic levels were reached May 7. Counts were as high as 1,000 per animal by May 24 on some beef herds. Peaks occurred in mid-June and late August. Numbers were probably about average. In the Everglades area, numbere peaked at 518 per animal June 9 on beef cattle. Counts were slightly lower during summer, reached peaks of 570 on October 15 and of 617 on October 30, and then declined to 125 on December 1.

Horn fly in ILLINOIS averaged 135 per animal, similar to that of 1968, from May through September on pastured cattle. However, counts persisted at higher levels and longer, well into September, in 1969 than in 1968. Adults over most of WISCONSIN slowly increased until late in June when reproduction and development accelerated due to warm weather. Annoyance was moderate in all areas by August 15. Counts averaged 100 flies per cow on Holsteins in Waushara County in August. This muscid fly was a major pest in MICHIGAN. Counts in NEW JERSEY were slightly less abundant than in recent years. Annoyance was spotty.

FACE FLY (Musca autumnalis) continued to spread in northern CALIFORNIA. Twelve counties are now infested. Annoyance in summer and movement into buildings in winter were severe. Several thousand parasites and predators were released for control of this pest in California. In OREGON it was particularly annoying in Jackson and Josephine Counties. An average of 10 per cow occurred in Washington County in early June. Face fly occurred in light numbers on WASHINGTON livestock and caused little annoyance. In IDAHO face fly ranged up to 4 (average 1) per face on beef and dairy herds at Kendrick, Moscow, and Potlatch in Latah County June 11. Counts ranged 1-15 (averaged 8 or less) per face on some pastured cattle in Latah and Benewah Counties in early July and ranged up to 40 per face in early August. Face fly in UTAH was an important cattle pest and a great annoyance to horses. In MONTANA counts were near the alltime high of 1967 in Gallatin and Ravalli Counties. This pest is not found or is below detection levels in many areas.

Face fly in NORTH DAKOTA reached 25 per face on range cattle by mid-June in Richland and Ransom Counties. Economic infestations only occurred in the sandhills area in these counties. Counts in SOUTH DAKOTA were about the same overall as in 1968. In northern Tripp County there were 1-5 per face on untreated stock in mid-July. Aerial spraying of beef cattle is increasing in the State. Counts in NEBRASKA were generally low statewide; 2-3 flies per animal infested 2 herds in Nemaha and Saunders Counties in mid-July. Face fly was found in Cherokee County, OKLAHOMA, for a new State record. Several herds were infested in June and July. This fly was also found in Benton County, ARKANSAS, for a new State record and in Washington County for a new county record.

Face fly annoyed cattle in some areas of east and central TENNESSEE. Warren County was a new county record. Face fly is known in 23 counties in the State. In ILLINOIS, counts of 11 per face on pastured cattle from May through September were almost identical to those of 1968. However, it persisted at higher levels and longer, well into September, in 1969 than in 1968. Face fly was a major pest in MICHIGAN. Populations in OHIO in 1969 were similar to or a little lighter than those in 1968. Economic losses only occur between a line through Paulding, Seneca, and Medina Counties and a line through Butler, Ross, and Athens Counties. In NEW JERSEY, face fly was more numerous and troublesome than in the previous 2 years.

LITTLE HOUSE FLY (*Fannia canicularis*) adults were heavier than usual during June at Caldwell, Canyon County, IDAHO, and were very annoying to homeowners. HOUSE FLY (*Musca domestica*) was a serious problem in many UTAH communities. Problems occurred about farms and communities, corrals, hog pens, and chicken coops. It greatly annoyed horses. *M. domestica* in OKLAHOMA was annoying to cattle and around barns from late April to late October. *M. domestica* problems in ARKANSAS are increasing in poultry houses. Controls were applied from February into November. *M. domestica* adults in ALABAMA were annoying around swine and poultry operations. It was a serious health hazard throughout the State. Large numbers entered poorly screened homes near dairy barns and poultry houses. *M. domestica* in FLORIDA was unusually heavy over a wide area of the Everglades on June 1, in and around livestock barns, pens, and in pastures at watering and feeding areas. Counts sharply increased near Gainesville, Alachua County, in dairy barns the last week of May and first week of June. House fly larvae heavily infested droppings of 30,000 birds in caged poultry operations in Baker County in early September. *M. domestica* was somewhat more numerous than normal in barns in ILLINOIS. Although not much higher than average, numbers remained abundant longer, well into September. Spraying for *M. domestica* began about June in WISCONSIN. House fly became a general nuisance in late July and much treatment on farms and in homes was necessary. *M. domestica* in NEW JERSEY was definitely more abundant around livestock earlier in 1969 than in 1968 due to plentiful rainfall. But by late July heavy rainfall had drowned many field populations. Fly control still is difficult due to increasing resistance to many residual-type sprays. *F. canicularis* in NEW JERSEY was typically abundant and troublesome to poultry due to plentiful rainfall during midsummer.

STABLE FLY (*Stomoxys calcitrans*) was an important cattle pest in UTAH. Occurring from late April to late November in OKLAHOMA, counts were heavy only in early September. Counts in NEBRASKA were slightly higher in 1969 than in 1968. Numbers built up rapidly by mid-June. Averages ranged 7-10 per leg June 17 on feedlot and dairy animals in Lancaster and Saunders Counties, and 20-25 per leg July 11 in untreated Lancaster County feedlots. Populations ranged 30-35 per leg the first half of August, and 10-15 flies per leg by August 22 in Lancaster County.

Stable fly counts of 9 per animal in ILLINOIS from May through September on pastured cattle were about the same as those of 1968. However, populations persisted at higher levels and longer, well into September, in 1969 than in 1968. It was somewhat more numerous than normal in barns. Stable fly was the most troublesome fly on cattle in most of WISCONSIN in 1969. Small numbers of adults were active in all areas by May 16, and control was underway by May 30 in

Calumet County. Annoyance increased late in June. Annoyance was moderate to severe in late July and August in Jefferson, Clark, Bayfield, Portage, Columbia, Richland, Chippewa, Calumet, Grant, Walworth, Rock, Price, Wood, Trempealeau, Jackson, and Winnebago Counties. Populations were high until October, but annoyance subsided due to cool weather.

Stable fly was much more abundant in NEW JERSEY than during recent years due to favorable breeding conditions in pastures in early July. It was very annoying to man and animals. Numbers were higher in west FLORIDA in 1969 than in any year since 1964, due primarily to the effects of Hurricane Camille. On the average, counts were probably lighter than usual on livestock in Alachua County. Counts peaked at 6-7 per animal in late June. Maximum numbers of flies per animal reached 130 near Hague, Alachua County, in late June. High populations probably resulted from spillage by bunker feeding of green chop.

MOSQUITOES were heavy due to winter and spring moisture in NEVADA. *Aedes dorsalis*, *A. melanimon*, *A. nigromaculis*, *Anopheles freeborni*, *Culex tarsalis*, and *Culiseta inornata* predominated. Mosquitoes in UTAH were serious in parts of Cache, Box Elder, Davis, Utah, Sanpete, Millard, Duchesne, Uintah, Piute, Rich, and other counties following storms. They were important cattle pests and greatly annoyed horses. Populations in WYOMING were generally lighter than in 1968. The heaviest counts occurred in Fremont, Hot Springs, Washakie, and Big Horn Counties. Mosquitoes annoyed man and animals throughout NEW MEXICO following summer rains.

Mosquito-borne encephalitis was not nearly so prominent as in past years in KANSAS. One case of St. Louis encephalitis was confirmed. A total of 36 cases in horses, about half the usual number, was reported. Annoying numbers of mosquitoes, mostly *Psorophora* spp., were found in scattered OKLAHOMA areas in late August and September. *P. confinnis* is a major nuisance to man and animals in ARKANSAS. Its numbers were in the millions in all low, level areas in late May, June, and into July or August. SALT-MARSH MOSQUITO (*Aedes sollicitans*), SOUTHERN HOUSE MOSQUITO (*Culex pipiens quinquefasciatus*), and other species in ALABAMA were annoying around homes, outdoor living quarters, and recreational areas, especially along the coastal areas and lakes. A wet year contributed to the low levels of floodwater mosquitoes over most of FLORIDA, except in the northwest area, the Keys, and possibly the extreme southwest coastal counties. South Walton County frequently reported the largest numbers of *Aedes taeniorhynchus* and *A. sollicitans*. Equine encephalitis was found in 272 animals in 11 months of 1969 compared with 41 animals in all of 1968. Heartworm was found in 913 animals in 11 months of 1969 compared with 989 in all of 1968.

Mosquitoes were heavy statewide in MINNESOTA by mid-July due to heavy rains in late June and early July. *Aedes vexans* was predominant. Severe biting in WISCONSIN started May 15 near woods and flood pools. The most prevalent species biting humans in May was FLOODWATER MOSQUITO (*A. sticticus*). Cattle were annoyed in many localities in late May and in June. Heavy rains early in June created favorable breeding conditions over most of the State except in several northwestern counties. Severe biting of humans occurred over most of the State from July 4 to August 1 and then subsided except in wooded lowlands. The predominant biters in Dane County were *A. trivittatus*, *A. vexans*, *A. excrucians*, *Culex pipiens*, and PITCHERPLANT MOSQUITO (*Wyeomyia smithii*). In MICHIGAN, *Aedes stimulans*, *Anopheles walkeri*, COMMON MALARIA MOSQUITO (*Anopheles quadrimaculatus*), *C. pipiens*, and *C. salinarius* were plentiful. *C. pipiens* was heaviest in State park sewage lagoons. Larval counts ranged as high as 3,000-4,000 per dip at two locations. Already troublesome by May 15 in Franklin and Ottawa Counties, OHIO, mosquitoes were heavier at the end of May than they have been for the past several years. At this time counts were moderate to high in Lucas County and high in Richland County. An extremely heavy rain July 4-5 fell north of a line from Ottawa County through Guernsey County. Within a week, biting was intolerable in Ottawa and Wayne Counties. By the end of July, northeastern Ohio had a serious public health problem. During August 13-26 some 3 million acres were sprayed in Huron, Ashland, Wayne, Holmes, Stark, Tuscarawas, Coshocton, Muskingum, and Harrison Counties. Seven to ten days later, adults had decreased by 97 percent. Dry weather from August 15 to September 15 reduced numbers.

Many mosquito species were abundant in VIRGINIA east of Montgomery County. Populations built up in July and remained in annoying numbers through September in some sections. In MARYLAND, female catches in 15 counties increased 16.4 percent over 1968 catches. The floodwater species increased the most significantly. *Aedes vexans* females doubled over last year's counts. Of 165,348 females trapped, 31,433 were *Anopheles crucians* and *A. bradleyi*; 37,329 *Aedes sollicitans*; 49,204 *Culex* sp.; 10,448 *Psorophora confinnis*, and 17,159 *A. vexans*. In DELAWARE, *Culex* spp., floodwater *Aedes* spp., and *Psorophora* spp. predominated. They were much more annoying than the usual salt-marsh species. Mosquitoes in NEW JERSEY were more abundant due to plentiful midsummer rainfall. The biting pressure was constant mostly by *Aedes* spp. throughout RHODE ISLAND during summer. Counts appeared heavier than in 1968.

COMMON CATTLE GRUB (*Hypoderma lineatum*) and NORTHERN CATTLE GRUB (*H. bovis*) appeared early in 1969 in CALIFORNIA. Imported cattle are partially responsible for the infestations in the State. In UTAH, *H. lineatum* and *H. bovis* were important cattle pests. In MONTANA many cattlemen applied systemic insecticides externally. *H. lineatum* and *H. bovis* adults were scarce. In NORTH DAKOTA 6.7 *Hypoderma* spp. grubs per head infested up to 41 (average 11) percent of the cattle in Morton, Stark, Williams, Ward, and Ramsey Counties. One to 10 grubs infested 82 percent, 11-20 infested 11 percent, and 20+ infested 7 percent of the infested animals. *H. bovis* grubs in WISCONSIN were trace in southeast counties, heavy in west counties, and moderate elsewhere, except in the far north tier of counties. A cattle grub survey was conducted in ILLINOIS on cattle that had been on pasture during spring and summer. These cattle ranged from 11 to 30 months of age. Collections also were made only from native cattle coming to packing houses from their respective areas. A total of 828 animals was checked for cattle grubs, with a State average infestation of 1.9 grubs per animal. Grubs averaged 3.5 per head for beef animals and 0.5 per head for dairy cattle. *H. lineatum* was more prevalent than *H. bovis*, especially in the southern one-half to two-thirds of the State. *H. lineatum* encysted in backs sooner (February and March) than *H. bovis* (March and April). In OKLAHOMA, *H. lineatum* was found in backs of cattle through late March. Adults occurred from late March to mid-May. Larvae were again found in mid-October. *H. lineatum* in ARKANSAS was later than usual in 1968-1969. Normally appearing in December, grubs did not appear in the backs of cattle until mid-January. This is not so severe a pest as it once was due to effective, widespread control. The highest numbers ranged up to 10 per head in untreated cattle, but averaged less than one per head in treated cattle. *H. lineatum* occurs statewide in ALABAMA. Populations and damage were about the same as in 1968, light to medium, probably due to better controls. *H. lineatum* infested cattle in the Everglades area of FLORIDA. Grubs peaked at 5 per animal in January. Infestations were about the same as in 1968 in Alachua County. A maximum number of 80.5 percent of beef cattle was infested in mid-January. Grubs averaged 7-8 per animal.

TABANID FLIES were important cattle pests and very annoying to horses in UTAH. Generally lighter than in 1968 in WYOMING, the heaviest numbers of HORSE and DEER FLIES occurred in Teton and Washakie Counties. *Chrysops* spp. and *Tabanus* spp. were very numerous in wooded areas by mid-July in MINNESOTA. Tabanid flies were active from mid-April to mid-September in OKLAHOMA. *Hybomitra nigricans* was heavy in the southeast area in late April and *Tabanus sulcifrons*, *T. lineola* complex, and BLACK HORSE FLY (*T. atratus*) were common for the rest of the season. *Diachlorus ferrugatus*, still the worst horse fly in most areas of FLORIDA, annoyed people and range cattle in late spring.

Adults of a BLACK FLY (*Simulium venustum*) appeared along eastern river areas in NORTH DAKOTA the first week of May. By mid-May, 5,000 flies per head annoyed livestock. Annoyance persisted into the first week of July in spite of a population decline. Black flies in MINNESOTA were numerous in Minneapolis and St. Paul the first half of June. *Simulium* spp. females were biting throughout RHODE ISLAND by May 4, particularly near streams. Heavy biting continued through May 25.

SHEEP KED (*Melophagus ovinus*) was common and numerous on sheep in UTAH. Controls were not applied to many flocks.

Several other Diptera were annoying. An EPHYDRID FLY (*Ephydra gracilis*) occurred in very heavy numbers in areas of UTAH. Large numbers of dead adults and puparia washed up on the beaches of the Great Salt Lake. The accompanying stench was annoying at lakeside resorts and at Antelope Island State Park. A BITING MIDGE (*Leptoconops kerteszi*) was annoying in these same areas of UTAH, as well as in parts of Millard, Juab, and a few other counties. Thousands of adults of a SPHAEROCERID FLY (*Leptocera* sp.) were annoying in the feed room and around windows in a large poultry house in Huntingdon County, PENNSYLVANIA, in late December 1968 and early January 1969. This fly was also annoying in November in a building housing earthworm beds in Crawford County. A SOLDIER FLY (*Hermetia illucens*) was severe during summer in caged poultry operations at several locations in Polk, Okeechobee, and Palm Beach Counties, FLORIDA. Larvae broke down droppings, creating a bad odor. Extensive flights of a MARCH FLY (*Plecia nearctica*) occurred in north-central FLORIDA in May and September for the fourth consecutive year. The September flight involved one-fourth to one-third of the land area in the State. Adults were also reported over the open waters of the Gulf of Mexico and the Atlantic Ocean.

BROWN DOG TICK (*Rhipicephalus sanguineus*) was more prevalent than usual in CALIFORNIA. *R. sanguineus*, LONE STAR TICK (*Amblyomma americanum*), and WINTER TICK (*Dermacentor albipictus*) caused problems in TEXAS. In OKLAHOMA *A. americanum* was common in east and central areas from late February through mid-September and GULF COAST TICK (*A. maculatum*) was heavy on cattle in Johnston County in late May. *D. albipictus* occurred in scattered areas of OKLAHOMA in January and early February and again from late September through December. In FLORIDA, *Anocentor nitens* transmitted 138 cases of equine piroplasmosis in 11 months of 1969 compared with 101 cases in all of 1968. Moderately heavy numbers of *R. sanguineus* in PENNSYLVANIA infested several hundred homes at Allentown, Lehigh County, during early spring. A resident of Centre County collected 55 specimens from his bedroom one night in July.

ROCKY MOUNTAIN WOOD TICK (*Dermacentor andersoni*) was heavier than usual in western WASHINGTON. In IDAHO, counts ranged 35-100 per head on 100 yearling steers at Spalding, Nez Perce County, April 3-4. A severe outbreak of tick paralysis caused about half of the herd to go down. The steers were able to get to their feet shortly after chemical applications. One steer died.

AMERICAN DOG TICK (*Dermacentor variabilis*) in IDAHO was more numerous than normal in Clearwater, Idaho, Nez Perce, and Owyhee Counties indicating establishment in these counties. In MINNESOTA it was numerous by late May and still active in the southeast area as late as July 25. Populations were heavier than usual throughout TENNESSEE. American dog tick was especially abundant and persisted from late April through June in most of DELAWARE. Populations in PENNSYLVANIA were fairly abundant in April and May in Perry, Cumberland, and York Counties. It was reported frequently from man and dogs. American dog tick was numerous throughout RHODE ISLAND May 12; it was more numerous than in 1968.

EAR TICK (*Otobius megnini*) in IDAHO was collected from a dog at Caldwell, Canyon County, August 16. Previous collections were made from Cassia, Elmore, Gem, Twin Falls, Valley, and Washington Counties. Ear tick infested cattle in several east-central counties of OKLAHOMA from early March through late September.

NORTHERN FOWL MITE (*Ornithonyssus sylviarum*) is still an important pest in heavy poultry-producing counties in ARKANSAS. Moderate infestations occurred in Augusta County, VIRGINIA, with the approach of fall. Damage was considered minor, but control measures were recommended. This mite was a serious pest in many flocks throughout PENNSYLVANIA. Egg production at several large poultry operations was reported to be down by 20 percent. Controls were difficult. Counts in NEW JERSEY were generally low and of little economic concern.

HOG LOUSE (*Haematopinus suis*) occurred in scattered areas of OKLAHOMA from late January to early May. In ALABAMA it was not a serious pest of most swine produced under well-managed conditions. Hog louse was heavy in Alachua and Suwannee Counties, FLORIDA, during spring. Infestation rates were about the same as in 1968.

SHORT-NOSED CATTLE LOUSE (*Haematopinus eurysternus*) was controlled with dips by some stockmen in MONTANA. Cattle lice, mainly *H. eurysternus*, were moderate to heavy on cattle in OKLAHOMA through mid-May. *H. eurysternus* was a serious external pest of cattle, especially range beef cattle, throughout ALABAMA and caused considerable loss of weight and vitality during late winter. CATTLE TAIL LOUSE (*H. quadripertusus*) in FLORIDA was common on untreated herds, probably heavier than in 1968, in Alachua County. Infestations ranged up to more than 400 adults on the tail brush until late December. In MICHIGAN, cattle lice, mainly *H. eurysternus*, were especially heavy during winter. In NEW JERSEY, only one large herd required control for *H. eurysternus* in Hunterdon County.

LONG-NOSED CATTLE LOUSE (*Linognathus vituli*) was a serious external pest of cattle, especially range beef cattle, throughout ALABAMA. A lot of weight and vitality was lost during late winter. In FLORIDA, this louse was heavy on dairy calves in November in Alachua County. Populations apparently were heavier than in 1968. It is controlled with dips by some stockmen in MONTANA.

CATTLE BITING LOUSE (*Bovicola bovis*) was controlled with dips by some stockmen in MONTANA. Cattle biting louse was a serious pest of cattle, especially range beef cattle, throughout ALABAMA. During late winter, infestations caused much loss of weight and vitality of infested animals. *B. bovis* and HORSE BITING LOUSE (*B. equi*) were heavy in Alachua County, FLORIDA, in March.

YELLOW JACKETS, mostly *Vespula pensylvanica*, were unusually heavy and troubled pickers in a peach orchard near The Dalles, Wasco County, OREGON. Some feeding damage to ripe peaches occurred. Unspecified YELLOW JACKETS were frequently troublesome about parks, canyon recreation areas, farms, and in cities in UTAH. Several VESPID WASPS (*Vespula* spp.) were extremely abundant throughout PENNSYLVANIA from August through October. Hospitals and health authorities reported twice the usual number of "bee sting" patients. *V. maculifrons* was much more abundant and annoying than last season in DELAWARE, especially in late July and August.

A SCYTODID SPIDER (*Loxosceles laeta*) occurred in a limited infestation at Sierra Madre and Alhambra, Los Angeles County, for a new State record in CALIFORNIA.

BROWN RECLUSE SPIDER (*L. reclusa*) has now been found in 14 NEBRASKA counties. A specimen was collected at Beatrice, Gage County, by V.B. McClure on June 4, 1969, and identified by R.E. Roselle. This is a new county record. *L. reclusa* was reported as a new State record in OHIO from a collection made in Huron County. It has also been collected in Athens, Clermont, Delaware, and Medina Counties. *L. rufescens* was reported as a new State record in OHIO. *L. reclusa* caused concern to many persons in TENNESSEE. It has been found in 39 counties. Decatur, Coffee, Hamilton, and Bradley Counties were new county records in 1969.

BLACK WIDOW SPIDER (*Latrodectus mactans*) was heavy in Douglas, Ormsby, Pershing, and Washoe Counties, NEVADA. Large numbers entered homes, garages, and warehouses in late September and October 1969, as in 1967.

HOUSEHOLDS AND STRUCTURES

Highlights:

SUBTERRANEAN TERMITES remained the chief structural pests in California, Alabama, Maryland, and Virginia. COCKROACHES were troublesome in homes in several areas.

GERMAN COCKROACH (*Blattella germanica*) was the more important of the several cockroaches that were widespread in ALABAMA. German cockroach was the most abundant and persistent household pest encountered in MARYLAND. An increase in the number of infestations of BROWN-BANDED COCKROACH (*Supella supellectilium*) over those of 1968 was noted in MARYLAND. *B. germanica* was the only cockroach reported in INDIANA during the 1969 season. In UTAH, *S. supellectilium* and ORIENTAL COCKROACH (*Blatta orientalis*) were the most common species in homes, apartments, and commercial buildings.

WESTERN SUBTERRANEAN TERMITE (*Reticulitermes hesperus*) was the most damaging species in CALIFORNIA. Termites, probably *R. hesperus*, caused heavy damage to structural timbers and flooring in a residence at Salmon, Lemhi County, IDAHO, following a large swarm of reproductives during late March. Alates were collected at a Cambridge, Washington County, residence during late May. *R. hesperus* was a structural pest in many communities in UTAH. EASTERN SUBTERRANEAN TERMITE (*Reticulitermes flavipes*) is still the major structural pest in ALABAMA. *R. flavipes* was swarming by March 19 in Providence County, RHODE ISLAND, with generalized swarming throughout the State by May 16. This termite caused economic damage to a variety of structures in central and southern MARYLAND. *R. flavipes* remains the chief pest of structures in the State. Damage will be in excess of several thousand dollars to homes in Montgomery, Prince Georges, Baltimore, and Anne Arundel Counties.

Unspecified termites were numerous in DELAWARE, especially during the spring and early summer. These pests were the most important structural pests again this year in VIRGINIA, although fewer cases and less structural damage were reported. Reports of damage were widespread, however.

WESTERN DRYWOOD TERMITE (*Incisitermes minor*) was found in a trailer-home near Chico, Kitsap County, WASHINGTON. The infestation was judged to have been present several years. *I. minor* was heavy and damaging to cabinets in mobile homes in Clark and Ormsby Counties, NEVADA. Treatments were required. A DRYWOOD TERMITE (*Incisitermes snyderi*) was reported in Coffee County, ALABAMA, in August. This was reported as a new county record. Colonies of A POWDER-POST TERMITE (*Cryptotermes brevis*) were reported inside two homes in Houston and Mobile Counties, ALABAMA, in April and June.

BLACK VINE WEEVIL (*Brachyrhinus sulcatus*) was found in homes in the Willamette Valley of OREGON in the fall. Other species, especially *B. rugosostriatus* and STRAWBERRY ROOT WEEVIL (*B. ovatus*), were more common in 1968. Mostly these DERMESTID BEETLES, VARIED CARPET BEETLE (*Anthrenus verbasci*) and *Trogoderma* spp. were unusually common in homes in the Willamette Valley in the fall. Populations appeared to be heavier than in 1968. A DERMESTID BEETLE (*Megatoma variegata*) was collected from a residence at Orofino, Clearwater County, IDAHO, on March 17. This species is uncommon. BLACK CARPET BEETLE (*Attagenus piceus*) was especially noticeable as a pest of cereals and fabrics in MICHIGAN. Carpet beetles were one of the three most numerous and destructive household pests in the State. CIGARETTE BEETLE (*Lasioderma serricorne*) was the main pantry pest throughout ALABAMA.

A CARPENTER ANT (*Camponotus herculeanus*) continued to be a perennial nuisance in and around homes in many areas of northern IDAHO during May. ODOROUS HOUSE ANT (*Tapinoma sessile*), ARGENTINE ANT (*Iridomyrmex humilis*), CARPENTER ANTS (*Camponotus* spp.), and *Liometopum occidentale* were of some concern in CALIFORNIA.

BOXELDER BUG (*Leptocoris trivittatus*) adults were very annoying in homes in late March in DELAWARE, especially in New Castle County. Boxelder bug was a common nuisance in homes in UTAH.

CASEMAKING CLOTHES MOTH (*Tinea pellionella*) and WEBBING CLOTHES MOTH (*Tineola bisselliella*) were the major pests of clothes, carpets, and upholstery materials in ALABAMA.

STORED PRODUCTS

Highlights:

CIGARETTE BEETLE damaged bulk tobacco in Virginia. INDIAN-MEAL MOTH infestations increased in Indiana, and the pest was found in several bins of stored soybeans in Illinois.

SAW-TOOTHED GRAIN BEETLE (*Oryzaephilus surinamensis*) was one of the three most numerous and destructive pests of stored products in homes in MICHIGAN. Saw-toothed grain beetle, DRUGSTORE BEETLE (*Stegobium paniceum*), and SPIDER BEETLES were the most frequently reported beetles infesting stored products in INDIANA. *O. surinamensis* was the most often reported. Saw-toothed grain beetle was heavy in stored oats and wheat in Emmons County, NORTH DAKOTA. The infestation caused heating. *O. surinamensis* was very common in home-stored flour and infested stored feeds for cattle and poultry on farms in UTAH.

RED FLOUR BEETLE (*Tribolium castaneum*) was more abundant than CONFUSED FLOUR BEETLE (*T. confusum*) in PENNSYLVANIA. Confused flour beetle damaged stored barley in Golden Valley County, NORTH DAKOTA. *T. confusum* and other cereal pests were more numerous in Canyon County, IDAHO, than in several years.

GRANARY WEEVIL (*Sitophilus granarius*) adults and larvae caused 100 percent damage to wheat, oats, and barley sampled in Foster County, NORTH DAKOTA. Granary weevil and RICE WEEVIL (*Sitophilus oryzae*) often infested stored wheat and other whole grain feeds in UTAH. *S. oryzae* was a serious pest of stored corn and grain sorghum in central and south ALABAMA.

CIGARETTE BEETLE (*Lasioderma serricorne*) damaged bulk tobacco in Roanoke, VIRGINIA, in late summer. Treatment was required to bring the infestations under control. Numerous household infestations of this beetle were also reported throughout the State. DRUGSTORE BEETLE (*Stegobium paniceum*) was the most common stored product pest reported in homes in VIRGINIA. There were numerous reports of this pest in stored products in the State, but most were infestations in homes.

INDIAN-MEAL MOTH (*Plodia interpunctella*) was one of the three most numerous and destructive pests of home-stored products in MICHIGAN. An increased number of infestations was reported in INDIANA during 1969. Indian-meal moth was found in several bins of stored soybeans in ILLINOIS. Only an occasional soybean storage area was infested before 1969. Indian-meal moth remained a problem in stored corn and milo in NEBRASKA. This pest is becoming increasingly more difficult to control with existing materials.

Blacklight trap collections in warehouses in MICHIGAN were carefully screened during the winter for adults of POTATO TUBERWORM (*Phthorimaea operculella*). Storage houses in Montcalm County appeared to be clean. Small moth populations in two warehouses in Bay County were eliminated by chemical controls and thorough cleaning. The number of inquiries concerning ANGOUMOIS GRAIN MOTH (*Sitotroga cerealella*) in INDIANA decreased in 1969. Angoumois grain moth was a serious pest of stored peanuts, corn, grain, sorghum, and feeds in ALABAMA. ALMOND MOTH (*Cadra cautella*) was serious and the more important pest of stored peanuts in ALABAMA.

GREENHOUSE SLUG (*Milax gagates*) and another SLUG (*Arion circumscriptus*) damaged potatoes in bulk storage at Monroe, Benton County, OREGON. The potatoes were muddy when put in storage, due to late harvest. These slugs left slime trails and ate holes in the potatoes. Rapid cleaning and processing prevented heavy damage. Bait pellets also aided in the control of the infestation.

BENEFICIAL INSECTS

Highlights:

BRACONIDS were effective in the control of pest species on several crops, particularly the greenbug outbreak on sorghum in Kansas. Several parasitic WASPS were released for the control of alfalfa weevil, cereal leaf beetle, green peach aphid, and gypsy moth. Some recoveries were reported. LADY BEETLES were effective in controlling greenbug and corn leaf aphid on wheat and grain sorghum in New Mexico, and greenbug on sorghum in Kansas. Several PREDATORS were heavy on some crops in several areas during the 1969 season

BRACONIDS were effective in controlling or aiding in the control of pest species in several areas of the Nation. Aphidius smithi was the main parasite of Acyrthosiphon pisum (pea aphid) at Touchet, Walla Walla County, WASHINGTON. Parasitism by a braconid, probably Aphidius pulcher, suppressed aphid populations in alfalfa hay fields at Post Falls, Kootenai County, IDAHO, in June and July. Aphid mummies ranged up to 8 per alfalfa leaf in untreated pea aphid infested fields in south-central and southeast areas. In NEVADA, unspecified braconids held populations of Rhopalosiphum maidis (corn leaf aphid), Schizaphis graminum (greenbug), pea aphid, and Therioaphis maculata (spotted alfalfa aphid) below economic levels, or helped to reduce damaging populations of these pest. Lysiphlebus testaceipes appeared in COLORADO toward the end of September and reduced aphid populations to very low levels. Lysiphlebus sp. was effective in aiding in the control of the greenbug outbreak on sorghum in KANSAS.

Braconids, especially L. testaceipes, were the most important parasites of aphids on cole crops, cotton, and grain in ALABAMA. Agathis stigmatera, widely distributed in the sugarcane region of south FLORIDA, parasitized about 20 percent of the Diatraea saccharalis (sugarcane borer) larvae sampled. Opius cereus, imported from Trinidad, was reared and released at Homestead, Dade County, FLORIDA, in mid-July. By September 2 it had parasitized 10 percent of the Anastrepha suspensa (Caribbean fruit fly) pupae in a sample from Dade County. One hundred adults of Microctonus aethiops were released against adults of Hypera postica (alfalfa weevil) in Pulaski County, VIRGINIA. The following braconids were released in DELAWARE: Microctonus sp. against alfalfa weevil, Praon myzophagum and Aphidius gifuensis against Myzus persicae (green peach aphid), and Dendrosoter protuberans against Scolytus multistriatus (smaller European elm bark beetle). Cocoons of Apanteles congregatus were common on Manduca sexta (tobacco hornworm) larvae by August 19 in RHODE ISLAND.

ICHNEUMON WASPS exerted some control of crop pests in 1969. Bathyplectes curculionis was very numerous in UTAH and parasitized a large percentage of alfalfa weevil larvae. B. curculionis counts in INDIANA were very high in Knox, Tippecanoe, and Lake Counties but remained low in the central and eastern districts. The high population range appears to be extending northward in the Wabash River Valley rather than eastward through the Ohio River Valley. B. curculionis probably reduced the level of damage by alfalfa weevil in the western districts. In MICHIGAN, recovery of B. curculionis during summer was less than 1 percent in most fields. Diaparsus spp. and Lemophagus curtus were released against Oulema melanopus (cereal leaf beetle) larvae at Gull Lake, Kalamazoo County, and at East Lansing, Ingham County, MICHIGAN. In VIRGINIA 100 adults of B. contracta were released against alfalfa weevil larvae in Charlotte County in May. Bathyplectes sp. was released against alfalfa weevil in DELAWARE.

An ENCYRTID WASP (Ooencrytus kuwanai) was released against Porthetria dispar (gypsy moth) in DELAWARE. About 9,582,500 O. kuwanai were released in PENNSYLVANIA. Releases were made at all gypsy moth catch sites west of the Susquehanna River and at many eastern locations. A total of 247 releases was made from August 26 to November 15.

A EULOPHID WASP (*Tetrastichus julis*) was released against cereal leaf beetle larvae in southwest Jackson County and at East Lansing, Ingham County, MICHIGAN. *T. julis* larvae were recovered at Gull Lake, Kalamazoo County, indicating probable establishment in Michigan since none were released there in 1969. Another EULOPHID WASP, *Aphelinus varipes*, was released against green peach aphid in DELAWARE.

A MINUTE EGG PARASITE (*Trichograma minutum*) was an important parasite of *Heliothis* spp. eggs on cotton in ALABAMA. In FLORIDA, *T. fasciatum* parasitized a small percentage of eggs of sugarcane borer.

A MYMARID WASP (*Anaphes flavipes*) was recovered for the second year at Gull Lake, Kalamazoo County, MICHIGAN. It appeared that this egg parasite of cereal leaf beetle is established there and at several other sites.

A VESPID WASP (*Odynerus dilectus*) was very abundant for the first time in Cache County, UTAH. In May it was one of the most common pollinators in several strawberry fields and on other flowers near Logan. In June a nesting site of several thousand individuals was found at North Logan. Several specimens were returning to the nest with alfalfa weevil larvae. Several cells were entirely provisioned with alfalfa weevil larvae.

HONEY BEE (*Apis mellifera*) winter survival was poor in central and eastern WASHINGTON, with 50 percent survival in Yakima County, 60 percent at Cashmere, Chelan County, and 75 percent at Spokane, Spokane County. As the acreage for alfalfa seed increased in NEVADA, colonies for pollination increased from 25,000 to 30,000. Honey bee colonies in ALABAMA remained at about 91,000. The honey crop in MICHIGAN was about average. More honey bee colonies were rented, particularly to growers of blueberries and pickling cucumbers. The number of colonies has increased during the past 5 years on the strength of pollination contracts although the price of honey remained static.

ALFALFA LEAFCUTTER BEE (*Megachile rotundata*) numbers used by alfalfa seed growers remained at about the 1968 levels in NEVADA. Specimens of a LEAFCUTTING BEE (*M. concinna*) were collected at Salt Lake City, Salt Lake County, UTAH, and in the Uintah Basin. This is a new State record. In UTAH, *M. rotundata* was beneficial where it was numerous in alfalfa seed areas. *M. rotundata* adults in IDAHO first appeared at Parma, Canyon County, May 31, several days earlier than usual. *M. rotundata* nest material imported from the Southwest to Yakima County, WASHINGTON, was found to contain *Tribolium brevicornis* (a tenebrionid beetle). This beetle is predaceous on *M. rotundata* larvae and feeds on stores in the nest. This was the first report of *T. brevicornis* in Washington.

LADY BEETLES, mostly CONVERGENT LADY BEETLE (*Hippodamia convergens*), held corn leaf aphid, greenbug, pea aphid, and spotted alfalfa aphid below economic levels or helped to reduce damaging populations in NEVADA. *H. convergens* was the dominant species on alfalfa in UTAH where pea aphid or spotted alfalfa aphid was numerous. Several species of lady beetles in WYOMING effectively reduced high populations of pea aphid in alfalfa and corn leaf aphid in corn in July and August. *H. convergens*, *H. sinuata*, *H. parenthesis*, and other species were heavy in eastern COLORADO. Counts ranged 80-150 per 100 sweeps in alfalfa and 3-4 per plant in corn and sorghum from June through most of August. Aphids were kept low to moderate. Lady beetles helped to control greenbug and corn leaf aphid on wheat and grain sorghum in east and south NEW MEXICO. Lady beetles in KANSAS helped bring the greenbug outbreak on sorghum under control. *H. convergens* was the most common predator on aphid-infested sorghum in many OKLAHOMA areas during summer.

Lady beetles, primarily *H. convergens* and *Coleomegilla maculata*, ranged 20-30 in 100 sweeps of wheat in northwest ARKANSAS March 28. Numbers declined slightly in April, increased to 200-300 in 100 sweeps of small grains and legumes by late May, declined in mid-summer, and increased with cooler fall weather. *H. convergens* and *C. maculata fuscilabris* were the more important lady beetles that fed on aphids on cotton, grain, and vegetables in ALABAMA. *C. maculata* and *H. tredecimpunctata* adults ranged 50-170 per 100 sweeps of alfalfa in north-central INDIANA May 16. The first larvae of the season, probably *C. maculata*, on oats in the north-central district were observed June 11. Adults had decreased to 3 per 100 row feet by June 27. Between July 31 and August 6, corn in the southeast, west-central, central, and east-central districts contained 2.6 egg masses per 10 stalks. The masses averaged 11.3 eggs. Hatching was well underway by August 6, yielding mostly *C. maculata*. In OHIO, *C. maculata* was one of four abundant beneficial insects and the most common lady beetle on oats, wheat, corn, and alfalfa. Early spring counts were as high as 10 adults per 25 sweeps of alfalfa. Later in the summer 2-5 adults and 3-5 larvae per aphid-infested cornstalk were common.

WEEVILS were released in attempts to control unwanted plant species. *Phrydiuchus spilmani* adults were released on Mediterranean sage (*Salvia aethiops*) in Lake County, OREGON, between October 9 and November 5. Adults of *Rhinocyllus conicus* were released in fields containing musk (*Carduus nutrans*) and curl thistle (*C. acanthoides*) in Russell and Pulaski Counties, VIRGINIA. In August, additional adults were released in Augusta, Shenandoah, Rockingham, Bath, Highland, Alleghany, Frederick, Clarke, Loudoun, and Page Counties.

DAMSEL BUGS (*Nabis alternatus* and *N. ferus*) in UTAH preyed on aphids, thrips, and related injurious forms. *Nabis* sp. was moderate on WYOMING alfalfa. In COLORADO, *Nabis* spp. were heavy and fed on aphids in alfalfa, corn, and sorghum. *Nabis* spp. were seen in some OKLAHOMA areas all year. They were the most common predators on alfalfa in the central and south-central areas in mid-July. *Nabis* spp. ranged 10-15 in 100 sweeps of alfalfa in northwestern ARKANSAS April 4. Present until frost in October, they were the most abundant predator in early fall. *N. ferus* ranged 4-5 per 25 sweeps of alfalfa during early spring and all summer in OHIO.

FLOWER BUGS (*Orius tristicolor* and *O. insidiosus*) and other anthocorids preyed on aphids, thrips, and related injurious forms in UTAH. *O. insidiosus* began reproducing May 2 in northwest ARKANSAS. By May 23, adults and nymphs ranged 150-200 in 100 sweeps of alfalfa. *Orius* spp. were one of the 2 more important Hemiptera in ALABAMA preying on eggs and larvae of *Heliothis* spp. on cotton, corn, tomatoes, soybeans, and snap beans.

BIG-EYED BUGS (*Geocoris* spp.) commonly preyed on aphids, thrips, and related injurious crop pests in UTAH. *Geocoris* spp. adults, 5-10 in 100 sweeps, first appeared by late May in ARKANSAS. Numbers declined with high temperatures. *G. punctipes* was one of the 2 more important Hemiptera in ALABAMA preying on eggs and larvae of *Heliothis* spp. on cotton, corn, tomatoes, soybeans, and snap beans.

GREEN LACEWINGS (*Chrysopa* spp.) were common on alfalfa in UTAH. Heavy numbers of *Chrysopa* spp. in COLORADO fed on aphids in alfalfa, corn, and sorghum. Green lacewings in KANSAS helped bring the greenbug outbreak on sorghum under control. *Chrysopa* spp. were the most common predators on alfalfa in northeast and north-central OKLAHOMA in late May. Larvae of GOLDEN-EYE LACEWING (*C. oculata*) were important predators of aphids on corn, grain sorghum, cotton, ornamental shade trees, and vegetables in ALABAMA.

SYRPHID FLY larvae were numerous in UTAH on alfalfa and in aphid-infested orchards. These larvae entered *Pemphigus* galls and aphid-rolled leaves, and were present wherever aphids were numerous. In OHIO, syrphid fly larvae were common in late summer among aphids on alfalfa and corn. Larvae, 1-10 per plant, suppressed aphids fairly well. In ALABAMA, syrphid fly larvae were important predators of aphids on corn, grain sorghum, cotton, ornamental shade trees, and vegetables.

A CINNABAR MOTH (Tyria jacobaeae) increased in an area of Curry County, OREGON. A number of larvae were moved to nearby sites. Tansy ragwort growth has been reduced, especially in local areas where this insect is very abundant. Larvae heavily damaged 1 acre of tansy ragwort at the 1966 release site at Amboy, Clark County, WASHINGTON.

A PHYTOSEIID MITE (Typhlodromus sp.) appeared to control Tetranychus mcdanieli (a spider mite) where sprays had not penetrated into the crowns of apple trees in Canyon and Payette Counties, IDAHO.

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